REMARKS

This is in response to the Office Action mailed on June 28, 2007. In the Office Action, claims 3, 4, and 16 were objected to. Claims 12-16 were rejected under 35 U.S.C. § 101 and claims 1-16 were rejected under 35 U.S.C. § 102(b). In this Office Action, claims 1, 3, 5, 8, and 12-16 have been amended.

The Office Actions indicates that claims 3, 4, and 16 are objected to. On page 2 of the Office Action it was noted that "claim 3 depends on itself, it is believed it should depend on claim 2 and is treated as such." The Office Action further pointed out that claim 3 discussed the limitation "disconnected phonetic hypotheses" which has no proper antecedent basis in the specification. In light of the Office Action's remarks, the preamble of claim 3 has been amended to "The method of claim 2....". Claim 3 has also been amended by replacing the term "disconnected phonetic hypotheses" with "inconsistent phonetic hypotheses," which has proper antecedent basis on page 10 of the application.

The Office Action states that claim 4 was objected to as "the limitation ranking the plurality of phonetic hypotheses identified" has no proper antecedent basis in the specification. Claim 4 does not refer to "ranking the plurality of phonetic hypotheses identified," however claim 5 does. It is assumed that the Office Action is referring to claim 5. In light of the Examiner's remarks, claim 5 has been amended to "comparing the plurality of phonetic hypothesis identified" (emphasis added). Comparing the plurality of phonetic hypothesis identified has proper antecedent basis on page 10 of the application.

Claim 16 was also objected to as depending on claim 1. The Office Action indicated "it is believed it should depend on claim 12 and is treated as such." In light of the Examiner's remarks, claim 16 has been amended to now depend off claim 12.

Rejection Under 35 U.S.C. § 101

On pages 2-3 of the Office Action, claims 12-16 were rejected as directed towards non-statutory subject matter. On page 3, paragraph 3 of the Office Action, the Examiner indicated that amending the claims to recite "computer storage media" would overcome the rejection in a manner consistent with the Applicant's specification. In light of the Office Action's remarks, independent claim 12 has been amended to "a computer readable storage medium." Claims 13-16 have similarly been amended to reflect a computer readable storage medium. It is believed the term "storage medium" is sufficient to overcome the 35 USC §101 objection.

Rejection Under 35 U.S.C. § 102

On page 3 of the Office Action, claims 1-16 were rejected as being anticipated by James et al. ("A Fast Lattice-Based Approach to Vocabulary Independent Wordspotting", hereinafter "James").

Claim 1 has been amended to recite:

"A method of searching audio data, comprising:

receiving a query comprising a grammar corresponding to pronunciation alternatives that define multiple phonetic possibilities for a segment of input speech; and

comparing the query with a lattice of phonetic hypotheses associated with the audio data to identify if at least one of the multiple phonetic possibilities is approximated by at least one phonetic hypothesis in the lattice of phonetic hypotheses." (emphasis added).

As pointed out in the application on page 12, paragraphs 1-2, the query can be a grammar corresponding to pronunciation alternatives that define multiple phonetic possibilities. In one embodiment, the grammar query can be represented as a weighted finite-state network. The grammar may also be represented by a context free grammar, unified language model, N-gram model and/or a prefrix tree, for example. As shown in the application on page 12, paragraph 3, complex expressions such as telephone numbers and dates can be searched based on an input grammar defining these expressions. Alternative pronunciations can be searched within the database simultaneously as well, providing an advantage over other non-grammar based queries.

The Office Action cited James, page 1, column 2, paragraph 4 comprising receiving a query defining multiple phonetic possibilities, by using the term "keyword

pronunciation." Applicants respectfully point out that nowhere in the cited sections of the James reference does it point towards a grammar-based system of receiving a query which defines multiple phonetic possibilities. Instead, James merely discloses evaluation on a single phone. As pointed out above, the grammar-based queries allow for many advantages which are not pointed out in the cited sections of James.

Claim 8 was also rejected under 35 U.S.C. § 102(b) as being rejected by James. Claim 8 has been amended to recite:

"A method of generating a lattice from audio data, comprising:

recognizing phonetic fragments within the audio data wherein at least some of the phonetic fragments include at least two phones;

accessing a mutual information score for recognized phonetic fragments within the audio data that include at least two phones, wherein the mutual information score for each of the phonetic fragments having at least two phones is a function of a likelihood that phones in the phonetic fragment occur consecutively and a likelihood that each phone in the phonetic fragment occurs independent of other phones in the phonetic fragment; and

determining a score for paths joining adjacent phonetic fragments in the audio data using in part the mutual information score for the phonetic fragments having at least two phones." (emphasis added)

As pointed out on page 11, paragraph 3 of the application, the speech recognizer operates based upon a dictionary of phonetic word fragments. The fragments can be determined based on a calculation of mutual-information of adjacent units, which may be phonemes or combinations of phonemes. The equation on pg. 11 line 10 indicates that mutual information can be a function of the likelihood that the phones in the phonetic fragment occur consecutively and a likelihood that each of the phonetic fragments occur independent of other phones. Phonetic word fragments can be eliminated from a candidate list based upon mutual information. For instance, phonetic fragments that span word boundaries are eliminated from the list. By merging phones into fragments, the lattice size is reduced, allowing for more accurate and efficient searching of the lattice (application, pg. 10, Para. 3).

The Office Action on page 5 states that James "discloses a method of generating a lattice from audio data comprising recognizing phonetic fragments within the audio data, wherein at least some of the phonetic fragments include at least two phones". The Office Action cited

page 1, column 2, paragraph 3 of James as using a modified Viterbi HMM-based phone recognizer. Applicants respectfully traverse this rejection in light of the following. The lattice on figure 1, page 2 of James indicates that the lattice comprises a series of nodes. Each node is a single phone. Each node is linked to another node, which again comprises another single phone, to create a lattice. However, nowhere in this reference does it state that mutual information is used to determine phonetic fragments comprising more than one phone. As indicated, the nodes in James comprise a single phone. Furthermore, nowhere does the James reference cite using mutual information as described above. The phonetic fragments used to construct a lattice of the application can consist of more than one phone, unlike the lattice used on fig. 1, page 2 of James. Nowhere does the Office Action disclose that the Vitberi HMM-based phone takes mutual information into account to recognize phonetic fragments comprising more than one phone. As a result, claim 8 is believed to be allowable over James.

The Office Action also rejected claim 12 is also rejected under 35 U.S.C. § 102. Claim 12 has been amended to:

"A computer readable storage medium encoded with a data structure, comprising:

a plurality of phoneme hypotheses and an associated score for each hypothesis, wherein at least some of the hypotheses form phonetic fragments that include at least two phones, and wherein the score for each phonetic fragment that includes at least two phones is a function of a likelihood that phones in the phonetic fragment occur consecutively and a likelihood that each phone in the phonetic fragment occurs independent of other phones in the phonetic fragment; and

a plurality of transitions connecting the phoneme hypotheses." (emphasis added)

As pointed out above, the citations to the current reference do not include determining phonetic fragments which can comprise more than one phone through mutual information. Thus, claim 12 is believed to be allowable.

Conclusion

It is therefore respectfully submitted in claims 1-16 are in form for allowance. Reconsideration and allowance of the claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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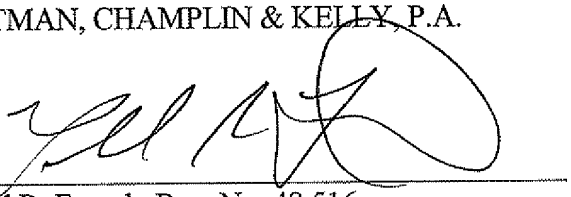
By 

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